

REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 2-7, 12-17, 19-24 and 29-41 are presented for consideration. Claims 2, 12, 22, 29, 34, 36, 38 and 40 are independent. Claims 1, 8, 11, 18, 25 and 26 have been cancelled without prejudice or disclaimer. Claims 2, 12, 22, 24 and 29 have been amended to clarify features of the subject invention and claims 30-41 have been added to recite additional features of the invention. Support for these changes and claims can be found in the original application, as filed. Therefore, no new matter has been added.

Applicant requests favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 2-8, 12-26 and 29 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Examiner objected to specific recitations in these claims. To expedite prosecution, Applicant has amended claims 2, 12, 22, 24 and 29, and has canceled claims 1, 8, 11, 18, 25 and 26. The Examiner's comments were taken into consideration when amending, for example, independent claims 2, 12, 22 and 29. Applicant submits that these changes overcome the rejection under 35 U.S.C. § 112, second paragraph. Such favorable indication is requested.

Applicant would, however, like to make the following comments with respect to newly presented claims 30-33. The distribution "20" shown in Figures 8 and 10, for example, represents an illuminance distribution. This distribution differs, however, from the illuminance intensity distribution recited in claims 30-33, for example. In more detail, in the embodiment

shown in Figure 8, for example, the luminous intensity distribution on the plane 20 becomes equivalent to the illuminance distribution upon the plane 3. In the embodiment shown in Figure 10, for example, the luminous intensity distribution on the plane 20 becomes equivalent to the illuminance distribution upon the plane 17. Such aspects of the invention are discussed in more detail on page 12, line 15, to page 13, line 2, as well as on page 14, line 13, to page 15, line 6. Applicant submits, therefore, that the features of the invention recited in claims 30-33, for example, would be readily understood by one having ordinary skill in the art.

Turning now to the art rejections, claims 1, 11, 25 and 26 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,797,674 to Nagayama. Claims 2-5, 8, 12-15, 18-23, 25, 26 and 29 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,218,660 to Omata. Claims 1, 11 and 24 were rejected under 35 U.S.C. § 103 as being unpatentable over the Omata patent.

Applicant submits that the cited art, whether taken individually or in combination, does not teach or suggest many features of the present invention as recited in the independent claims. Therefore, these rejections are respectfully traversed.

In one aspect of the invention, independent claim 2 recites an illumination optical system having a total reflection type light transmitting element for illuminating a surface to be illuminated. The illumination optical system includes an imaging optical system for forming an image of a light source upon a predetermined plane by use of light from the light source and a converting optical system for directing light from the light source image formed by the imaging optical system to the light transmitting element. The converting optical system is arranged to

place the predetermined plane and a light entrance surface of the light transmitting element in a Fourier transform relation.

In another aspect of the invention, independent claim 12 recites an illumination optical system for illuminating a surface to be illuminated, with light from a light source and by use of an optical fiber bundle. The illumination optical system includes an imaging optical system for forming an image of a light source on a predetermined plane, by use of light from the light source, and a converting optical system for directing light from the light source image formed by the imaging optical system to the optical bundle. The converting optical system is arranged to place the predetermined plane and a light entrance surface of the optical fiber bundle in a Fourier transform relation.

In still another aspect of the invention, independent claim 22 recites an illumination optical system having a total reflection type light transmitting element for illuminating a surface to be illuminated. The illumination optical system includes a plurality of light sources for illuminating a predetermined plane and a converting optical system, disposed between the predetermined plane and the light transmitting element, for directing light from the plurality of light sources to the light transmitting element. The converting optical system is arranged to place the predetermined plane and a light entrance surface of the light transmitting element in a Fourier transform relation.

Applicant submits that the cited art, whether taken individually or in combination, does not teach or suggest such features of the present invention, as recited in independent claims 2, 12 and 22, for example.

The Nagayama patent shows an optical system 302 for directing light from a light source image of a light source 300 into an optical fiber 303, as shown in Figure 1 of that patent. Applicant submits, however, that this optical system merely functions to place the light source image and the light entrance surface of the optical fiber in a conjugate relation with each other. Thus, that arrangement does not function to place the light source image and the light entrance surface of the optical fiber in a Fourier transform relation, in the manner of the present invention recited in independent claims 2, 12 and 22.

The Omata patent shows a fly's eye lens 3 and a lens 4 for directing light from a light source image of a light source 1 into a light pipe, as shown in Figures 2 and 10 of that patent. Applicant submits, however, that the fly's eye lens 3 and the lens 4 merely function to place the light source image and the light entrance of the light pipe in a conjugate relation with each other. Thus, those elements do not function to place the light source and the light entrance surface of the light pipe in a Fourier transform relation, in the manner of the present invention recited in independent claims 2, 12 and 22.

For the reasons noted above, Applicant submits that the Nagayama patent and the Omata patent do not teach or suggest many features of the present invention recited in independent claims 2, 12 and 22. Accordingly, the present invention, as recited in those claims, should be deemed allowable over the cited art.

For reasons similar to those advanced above with respect to independent claims 2, 12 and 22, Applicant submits that independent claims 29, 34, 36, 28 and 40 patentably define features of the subject invention. Notably, independent claim 29 recites a converting optical system having

features similar to those discussed above with respect to those recited in independent claim 12. Similarly, independent claims 36, 38 and 40 recite aspects of a converting optical system providing a Fourier transform relation with certain elements. Accordingly, Applicant submits that those claims, likewise, should be deemed allowable over the cited art.

For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 2, 12, 29, 34, 36, 38 and 40, is patentably defined over the cited art.

The dependent claims also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicant further submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Steven E. Warner", is written over a horizontal line.

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